1. OVERVIEW

Subject area	DISCRETE MATHEMATICS
Degree	Bachelor's Degree in Data Science
School/Faculty	Faculty of Science, Engineering and Design
Year	2º
ECTS	6
Type	Core
Language(s)	Spanish
Delivery Mode	On campus
Semester	Semester 1

2. INTRODUCTION

Discrete Mathematics is very important for the way it is applied in digital and IT processes. It has evolved significantly thanks to the introduction of computers, but it also has an important role in other areas such as communications or transport. It mainly deals with the study of mathematical properties of sets, systems and structures that are countable. We will start this course by studying logic - the basis of mathematical reasoning and proof. Then we study sets, functions, algorithms, combinatory logic, relations and graph theory.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by the acronym in Spanish):

- CB1: Students have shown their knowledge and understanding of a study area originating from general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
- CB4: Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT2: Independent learning: know how to choose strategies to search, analyse, evaluate and manage information from different sources, as well as to independently learn and put into practice what has been taught.

- CT3: Teamwork: ability to integrate and actively participate with other people, departments and/or organisations to reach common goals.
- CT4: Oral or written communication: ability to communicate and gather information, ideas, opinions and viewpoints to understand and be able to act, spoken through words or gestures or written through words and/or graphic elements.
- CT5: Analysis and problem solving: be able to critically assess information, break down complex situations, identify patterns and consider different alternatives, approaches and perspectives in order to find the best solutions and effective negotiations.
- CT6: Adapting to change: be able to accept, consider and integrate different perspectives, adapting your own approach as required by the situation at hand, and to work effectively in ambiguous situations.

Specific skills (CE, by the acronym in Spanish):

- CE1 - Ability to solve mathematical problems which may arise in engineering and data science by applying linear algebra, geometry, differential and integral calculus, discrete mathematics and optimisation.

Learning outcomes (RA, by the acronym in Spanish):

- RA1: Correctly approach a mathematical problem.
- RA2: Solve a problem using the right mathematical language and the most suitable method.
- RA4: Take part in group projects, taking responsibility for the work assigned and presenting results orally or in writing.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB1, CB4, CT2, CT3, CT4, CT5, CT6	RA1
CB1, CB4, CT2, CT3, CT4, CT5, CT6, CE1	RA2
CB4, CT3, CT4, CT6	RA4

4. CONTENTS

The subject matter is divided into five units: Unit 1. Mathematical

logic
Unit 2. Theory of sets, functions and relations Unit 3. Boolean algebra Unit 4.
Combinatory logic
Unit 5. Graph theory

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Collaborative learning
- Problem-based learning (PBL)
- Master lectures
- Gamification

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Master lectures	43
Independent working	37.5
Problem solving and case studies	53
Practical seminars and debates/discussions	3
Learning contract	2
Knowledge tests	4
Tutorials	7.5
TOTAL	**150**

7. ASSESSMENT

The assessment methods, plus their weighting in the final grade for the subject area, are as follows:

On campus:

Assessment system	Weighting
Knowledge tests	65
Problem-solving	25
Attitude assessment	5
Self- or peer-assessment	5

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The reference publication to accompany this subject area is:

- GARCÍA MERAYO, F. 2015. Matemática discreta. Paraninfo
- GARCÍA MERAYO, F. y HERNÁNDEZ PEÑALVER, G. 2003. Problemas resueltos de matemática

discreta. Paraninfo
- JOHNSONBAUGH, R. 2005. Matemáticas discretas. Pearson-Prentice Hall
- HORTALÁ, M.T. y otros. 2018. Matemática discreta y lógica matemática. Garceta